

Claims

WHAT IS CLAIMED IS:

1. A method for establishing a virtual path aggregation in a network, the method
5 comprising:

receiving a request for a virtual path aggregation, wherein the request indicates a
desired data path between a source switch and a destination switch, wherein the request
includes a traffic descriptor and a virtual path identifier for the virtual path aggregation;

10 determining if there is a trunk group within the source switch having a virtual path
identifier that matches the virtual path identifier of the virtual path aggregation;

when the trunk group having a virtual path identifier that matches the virtual path
15 identifier of the virtual path aggregation is present:

comparing bandwidth characteristics included in the traffic descriptor of
the virtual path aggregation with bandwidth limitations of the trunk group;

20 when the bandwidth characteristics of the virtual path aggregation
compare unfavorably with the bandwidth limitations of the trunk group, rejecting
the virtual path aggregation request; and

when the bandwidth characteristics of the virtual path aggregation
25 compare favorably with the bandwidth limitations of the trunk group, creating the
virtual path aggregation such that the virtual path aggregation corresponds to the
trunk group.

2. The method of claim 1, wherein when the trunk group having a virtual path identifier that matches the virtual path identifier of the virtual path aggregation is not present:

5 comparing the bandwidth characteristics of the virtual path aggregation with bandwidth limitations of a port within the source switch;

 when the bandwidth characteristics of the virtual path aggregation compare favorably with the bandwidth limitations of the port, creating the virtual path aggregation such that the virtual path aggregation corresponds to the port;
10 and

 when the bandwidth characteristics of the virtual path aggregation compare unfavorably with the bandwidth limitations of the port, rejecting the
15 virtual path aggregation request.

3. The method of claim 2, wherein creating the virtual path aggregation such that the virtual path aggregation corresponds to the port further comprises creating the virtual path aggregation such that the virtual path aggregation supports permanent virtual
20 connections.

4. The method of claim 1, wherein creating the virtual path aggregation such that the virtual path aggregation corresponds to the trunk group further comprises:

25 for at least one service category within the trunk group, determining if bandwidth limitations of the virtual path aggregation corresponding to the service category are more restrictive than bandwidth limitations of the trunk group corresponding to the service category;

when the bandwidth limitations of the virtual path aggregation are more restrictive, updating a routing table to reflect the bandwidth limitations of the virtual path aggregation for the service category; and

5 when the bandwidth limitations of the trunk group are more restrictive, updating the routing table to reflect the bandwidth limitations of the trunk group for the service category.

5. The method of claim 4, wherein updating the routing table further comprises
10 broadcasting bandwidth limitations to at least one additional routing table in the network.

6. The method of claim 1, wherein creating the virtual path aggregation such that the virtual path aggregation corresponds to the trunk group further comprises creating the virtual path aggregation such that the virtual path aggregation supports virtual channel
15 connections.

7. The method of claim 1, wherein the virtual path aggregation is virtual path connection that supports at least one virtual channel connection, wherein set up and shaping of the virtual path aggregation provides set up and shaping of the at least one
20 virtual channel connection.

8. An apparatus for connection admission control comprising:

a processor;

a memory operably coupled to the processor, wherein the memory stores a connection admission control algorithm, wherein when executed by the processor, the connection admission control algorithm causes the processor to:

determine, in response to a request for a virtual path aggregation, if there is a trunk group, within a source switch, having a virtual path identifier that matches the virtual path identifier of the virtual path aggregation, wherein the request indicates a desired data path between the source switch and a destination switch, wherein the request includes a traffic descriptor and a virtual path identifier for the virtual path aggregation;

reject the virtual path aggregation request when:

there is a trunk group within the switch with the same virtual path identifier as the virtual path aggregation; and

bandwidth characteristics of the virtual path aggregation that are included in the traffic descriptor compare unfavorably with bandwidth limitations of the trunk group; and

create the virtual path aggregation such that the virtual path aggregation corresponds to the trunk group when:

there is a trunk group within the switch with the same virtual path identifier as the virtual path aggregation; and

the bandwidth characteristics of the virtual path aggregation compare favorably with bandwidth limitations of the trunk group.

9. The apparatus of claim 8, wherein the connection admission control algorithm

further comprises operating instructions that cause the processor to:

reject the virtual path aggregation request when:

there is not a trunk group within the switch that has a virtual path identifier that matches and virtual path identifier of the virtual path aggregation; and

the bandwidth characteristics of the virtual path aggregation compare unfavorably with bandwidth limitations of a port within the source switch; and

create the virtual path aggregation such that the virtual path aggregation corresponds to the port when:

there is not a trunk group within the switch that has a virtual path identifier that matches and virtual path identifier of the virtual path aggregation; and

the bandwidth characteristics of the virtual path aggregation compare favorably with bandwidth limitations of the port.

10. The apparatus of claim 8, wherein the connection admission control algorithm further comprises operating instructions that cause the processor to create the virtual path aggregation corresponding to the trunk group such that the virtual path aggregation supports switched connections.

11. The apparatus of claim 8, wherein the connection admission control algorithm further comprises operating instructions such that when the processor creates the virtual path aggregation corresponding to the trunk group, the processor

determines, for at least one service category within the trunk group, if bandwidth limitations of the virtual path aggregation corresponding to the service category are more restrictive than bandwidth limitations of the trunk group corresponding to the service category;

updates a routing table to reflect the bandwidth limitations of the virtual path aggregation for the service category when the bandwidth limitations of the virtual path aggregation are more restrictive; and

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updates the routing table to reflect the bandwidth limitations of the trunk group for the service category when the bandwidth limitations of the trunk group are more restrictive.

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12. The apparatus of claim 11, wherein the connection admission control algorithm further comprises operating instructions such that when the processor updates the routing table, the processor broadcasts bandwidth limitations in the routing table to at least one additional routing table in the network.

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13. The apparatus of claim 8, wherein the connection admission control algorithm further comprises operating instructions such that when the processor creates the virtual path such that it supports at least one virtual channel connection, wherein set up of the virtual path aggregation provides set up of the at least one virtual channel connection.

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14. A method for establishing a connection over a virtual path aggregation,
comprising:

receiving a request for a connection, wherein the request includes a service
5 category and a bandwidth requirement for the connection;

rejecting the request when the service category of the connection is not supported
by a trunk group that includes the virtual path aggregation;

10 determining if the connection is a virtual channel connection type;

when the connection is a virtual channel connection type:

determining if the service category for the connection is supported by the
15 virtual path aggregation;

when the service category for the connection is supported by the virtual
path aggregation:

20 determining if the bandwidth requirement for the connection is
within available bandwidth of the virtual path aggregation and a partition
corresponding to the trunk group;

when the bandwidth requirement for the connection is
25 within the available bandwidth of the virtual path aggregation and
the partition, establishing the connection within the virtual path
aggregation; and

when the bandwidth requirement for the connection is not within the available bandwidth of the virtual path aggregation and the partition, rejecting the connection request.

5 15. The method of claim 14 further comprises:

when the connection is a virtual path connection type,

10 determining if the bandwidth requirement for the connection is within available bandwidth of the trunk group;

when the bandwidth requirement for the connection is within the available bandwidth of the trunk group, establishing the connection within the trunk group outside the virtual path aggregation; and

15 when the bandwidth requirement for the connection is not within the available bandwidth of the trunk group, rejecting the connection request.

20 16. The method of claim 15, wherein establishing the connection further comprises:

determining available bandwidth within the trunk group for at least one service category supported by the trunk group; and

25 updating a table to reflect the available bandwidth within the trunk group.

17. The method of claim 16, wherein determining available bandwidth for a service category further comprises determining which is lesser between available bandwidth of the virtual path aggregation for the service category and available bandwidth of the trunk group for the service category.

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18. An apparatus for connection admission control that controls connections using a virtual path aggregation within a trunk group, comprising:

a processor;

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a memory operably coupled to the processor, wherein the memory stores a connection admission control algorithm, wherein when executed by the processor, the connection admission control algorithm causes the processor, in response to a request for a connection that includes a service category and a bandwidth requirement of the connection, to:

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reject the request when the service category of the connection is not supported by the trunk group;

determine if the connection is a virtual channel connection type;

when the connection is a virtual channel connection type:

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determine if the virtual path aggregation supports the service category for the connection;

when the virtual path aggregation supports the service category:

determine if the bandwidth requirement for the connection is within available bandwidth of the virtual path aggregation and a partition of the trunk group;

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when the bandwidth requirement for the connection is within the available bandwidth of the virtual path aggregation and the partition, establish the connection within the virtual path aggregation; and

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when the bandwidth requirement for the connection is not within the available bandwidth of the virtual path aggregation and the partition, reject the connection.

19. The apparatus of claim 18, wherein the connection admission control algorithm further comprises operating instructions that cause the processor to:

when the connection is a virtual path connection type:

5 determine if the bandwidth requirement for the connection is within available bandwidth of the trunk group;

when the bandwidth requirement for the connection is within the available bandwidth of the trunk group, establish the connection within the trunk group outside the virtual path aggregation; and

10 when the bandwidth requirement for the connection is not within the available bandwidth of the trunk group, reject the connection request.

20. The apparatus of claim 19, wherein the connection admission control algorithm further comprises operating instructions such that when the processor establishes the
15 connection the processor:

determines available bandwidth within the trunk group for at least one service category supported by the trunk group; and

updates a table to reflect the available bandwidth within the trunk group.

20 21. The apparatus of claim 20, wherein the connection admission control algorithm further comprises operating instructions such that the processor determines available bandwidth within the trunk group for the service category by determining which is lesser between available bandwidth of the virtual path aggregation for the service category and available bandwidth of the trunk group for the service category.

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